BUSINESS INTELLIGENCE

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Abstract

A Business Intelligence (BI)-driven approach can be very effective in implementing business transformation programs within an enterprise framework. In this respect, the value proposition associated with BI reaches far beyond the capability to pull together and analyze data. In fact, this paradigm is a key enabling process and technology that can drive the resolution of fundamental enterprise design challenges. The aim of this paper is to briefly identify the architecture and concepts of Business Intelligence in competitive markets. A short description of architecture for Software as a Service and success factors consideration for implementation of business intelligence can be found at the end of the article.

Keywords: business intelligence, architecture, concepts, dashboards, ETL, data mining

Introduction

The economic activity generates an ocean of data. Each bite of data represents a small piece of the business and can be found in different locations or departments, sometimes in wide geographic areas. Often it is locked on a forgotten harddisk or on a archived covered with dust. In business the truth, strong points and weaknesses lay on data. Using business intelligence data is gathered, transformed in information which can be further analyzed and used in decision making process and materialized into actions.

In the present conditions of the business environment, quality and fast delivery of information represents for the company not a choice between profit and loss but a survival matter and bankruptcy. The benefits of a business intelligence system are more than clear – the analysts are optimistic showing that in the coming years millions of people will use each day visualization and analysis tools and business intelligence. The market has a numerous players which offer a number of various analytical applications which can produce analysis to sustain the decision support process at all levels.

Around this concept some other terms has been launched by the analysis of economic information such as: business performance management (BPM), business process management (BPM), corporate performance management(CPM) as well as business activity monitoring(BAM). All these components are included in business intelligence and depend on their tools.

Definition and benefits of Business Intelligence

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The analyst Howard Dresner from Gartner Group proposed the usage of the term business intelligence in 1989. The roots of this concept can be found in 70's in reporting systems of mainframes when the reports were static, bi-dimensional and without analytical facilities. The will and requirements for dynamic reporting services, multi-sources, support decision predictive have determined the evolution of Business Intelligence, which became a reality once with the evolution of new technologies. The evolution from 90's extended and improved Business Intelligence and the prediction is that soon will become a part of informatics system of the companies.

Although it is linked with company enterprise software, Business Intelligence is not a product or a system but an umbrella concept which covers architectures, applications and data warehouses. Its main purpose is to provide easy access for users to data by accessing real time data warehouses, manipulation and analysis. Analyzing historic data Business Intelligence can highlight activities and business status and managers can rely in decision making process including behavior and predicition.

The key of understanding Business Intelligence lays in understanding how data is transformed into information and how these information are analyzed. Business Intelligence does not produce data, but utilizes the data produced by company's software applications such as: ERP, CRM, SCM etc. In last two decades, especially in 90's in organizations large volumes of data has been stored using ERP systems based on OLTP (online transactional processing). The next step was to organize this data to take advantage so big data warehouses have been built, ETL (extract, load and transform) instruments have been used for exploitation of these data. Although specialists consider that in these conditions too few data was transformed in information and the most effective utilized as a decision support were even fewer. What is the cause of all this? The answer is lack of suited instruments for finding and analyzing data. Business intelligence was missing.

The most important fields for Business Intelligence solutions are:

- General reporting
- Analyzing sales and marketing
- Forecasting and planning
- Financial consolidation
- Budgeting
- Profitability analysis

The effects of installing a Business Intelligence system are astonishing, because this produces the needed information exactly when it is needed, assuring one of the ingredients for a successful business. Business Intelligence is the art of knowledge and takes advantage of information winning against competition. Business Intelligence can offer answers to the essential problems of an organization helping the company to take fast and reliable decisions. Finding good answers is based on analysis and comparison of historical data created in the organization as well as data from external sources. Putting all this data together and analysis of this data enhances the understanding of business trends, of strong and weak points, analysis of competition and market environment.

The benefits of Business Intelligence utilization are the following:

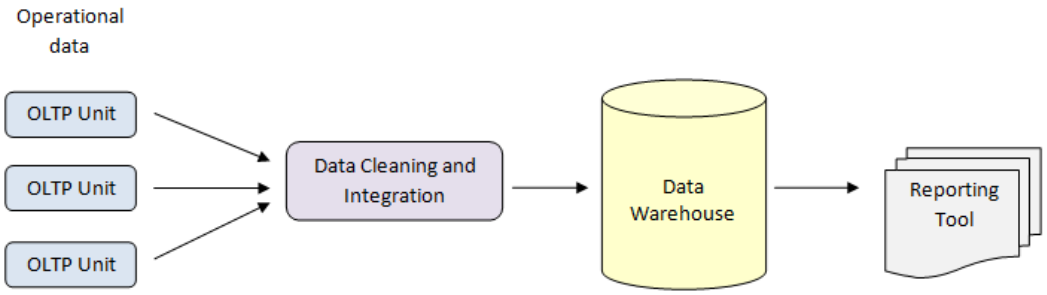
- Reliable and faster reports
- Improvement of decision making process
- Client relationships
- Higher incomes
- Cutting cost of non IT expenses

The surveys shows that Business Intelligence brings a big value to organizations: 60% of companies which implemented a Business Intelligence system reach their objectives and 19% they have exceeded the targets.

The users of Business Intelligence agree that the results of implementation are better than other ERP solutions. The benefits are considered to be greater, more visible and faster. Although the benefits of Business Intelligence systems are built on ERP systems which provides data necessary to build warehouses. As I emphasize Business Intelligence shows essential information from ERP systems offering an excellent support decision mechanism but will never have a chance if the data warehouses cannot rely on all data of the organization.

Architecture And Components Of A Business Intelligence System

As I showed previously, Business Intelligence is a combination of architecture and software technologies. Architecture of Business Intelligence puts together the following instruments: data warehouses and data marts, ETL (extract, transform, load), report and query instruments, data visualization instruments, dashboards, OLAP (online analytical processing), data mining, alerting and notification systems.



Data Warehouses

Different sources of data coming from OLTP, ERP, CRM, SCM, other organization applications and external sources it means data bases with different formats and specific data structures. Having all them together is extremely important, due the fact the data warehouse which assures the capturing and unification of data is considered the number 1 player and most expensive in Business Intelligence system. The data keeper supports the decision making process for operational and tactical team and provides a bouquet of visualization and analysis choices of data and support the data requirements of top-management. Data extracted from this data warehouse for each department are gathered in

data marts which assures fast and easy access, for instance: marketing data, production data, sales data.

ETL Instruments

The process of populating data warehouse is realized thru ETL process: extract, transform and load, which are three distinct functions. The first one – extraction, reads data from multiple sources and extracts the required data. The second – transformation works with data utilizing rules and creating combinations with other data and converts data to desired format. In the end the loading process writes data in the data warehouse assuring the conversion between data bases and migration from one platform to another.

Reporting And Visualization Instruments

One of the Business Intelligence functions is the reporting and defines the process of accessing data, formatting and delivery as decision support information. Reports and requirements are obtained using data base interrogation language SQL.

The preferred type of data visualization is graphical representation. With the help of these tools the information and relation between information is consumed by the user. The user can combine different representation of data and different views of the same data set.

Balanced Scorecards

Balanced Scorecards are meant to help the user to put the strategy into practice. This is about a system to measure performances, derived from the objectives and strategy of organization, which reflects the most important aspects of the business. Balanced scorecards can be seen as a central list of predefined numbers, each of them assigned to one key component of a successful business. Balanced scorecards focuses on strategic level of management objectives and using these instrument managers from all levels can monitor the results in the key zone of a business.

Dashboards

Dashboards materialize into a user interface which puts together and shows information in an easy and intuitive manner. Practically the desktop is organized so that can offer necessary information, in the most proper way and to assure interactivity with the manager user.

OLAP

The OLAP – online analytical processing component allows the user to extract and present data from different points of view. This analysis is possible only in multidimensional databases. The most important is the OLAP server located between

client and SGBD. OLAP instruments allow analysis based on different dimensions of multidimensional data and is used frequently in data mining.

Data Mining

The name of these instruments reflects clearly their scope that you have to dig to find useful data for your organization. Data mining extracts information hidden in data bases and can search using different patterns in OLTP data bases.

Alert And Notification Services

Alert and notification services work proactively, offering the users information on the predefined criteria, once the events occur. The users know in every moment about the most important events – the messages can be consumed at work desk, at home, on the road using mobile technologies.

An Architecture For Software-As-A-Service (SAAS) BI

The current demands of today's economic environment require enterprises of all types to efficiently leverage their increasing data assets in order to make informed decisions to support their business processes. For this reason, companies are challenged with escalating demands for more business intelligence (BI) across all levels of their enterprise. At the same time, companies are increasingly becoming more familiar with the concept of Software-as-a-Service (SaaS) as a way to have technology available on-demand, reducing their burden in terms of deployment, configuration, maintenance, and other inherent project risk factors. These two trends combined translate into a need for immediate return on investment on projects that enable them to collect and analyze corporate information to get an accurate view of their business across the entire organization.

Simply defined, SaaS is software deployed by a hosted provider that can be accessed over the Internet. The main characteristics of a SaaS application include:

- **Multi-tenancy support** – enabling a single instance of software to serve multiple client organizations, or tenants.
- **Fast development and ease of maintenance** – minimizing deployment and maintenance work, for both the SaaS provider as well as for its clients.
- **Centralized administration** – providing large amounts of data to more users while using administrative resources efficiently.
- **Comprehensive security** – sharing the resources available across multiple users or tenants while still being able to differentiate data and functionality available to each individual customer.
- **High scalability and performance** – providing a reliable 24x7 operation under high user concurrency and vast amounts of data.
- **Ease-of-use** – maximizing end user self-service through advanced functionality delivered in an easy-to-use interface.
- **Flexible and personalized interface** – modifying and extending the user interface to satisfy individual needs, including application look-and-feel, sophisticated functionality, and engaging ways of displaying relevant information to users.

Over the past twenty years, most organizations have required all major technologies to be installed in-house, often due to requirements of security, availability, and convenience. Specific to BI, many of these same organizations acquired a diverse collection of products because each of these different technologies offered a particular strength in a single area. Many of the more sophisticated products were built using client-server architectures or leveraging client technologies such as Java or ActiveX, and have proven to not be pervasive or easily-deployed in an on-demand SaaS model.

With the advent of more sophisticated, demanding end users, pervasive Internet connectivity, improvements in the scalability and security of middleware and back-end technologies, and defined open standards, we are in the midst of a major transformation in the BI industry towards an on-demand model. Whether an organization that has built an enterprise data warehouse is opening up that data to third party partners and customers or a data syndicator is building a shared data warehouse to deliver value to multiple customers, a sophisticated BI platform is required to deliver the demands of these SaaS applications.

Success Factors

The three major subsystems – Data Integration Services, Decision Repositories, and Decision Services – are part of an information supply chain. Data starts in raw form, goes through transformations, storage, distribution, and packaging until it reaches the final consumer. All three are needed to support pervasive BI.

Pervasive BI exposes a need that was often not present in traditional BI – SLAs in all three subsystems. This is because the front-line user has near real-time performance expectations, 24 hours per day, and 365 days per year. It is irrelevant to the call center or web site consumer what part of the infrastructure is failing or slow. Thus, the critical success factors focus on formal SLAs for:

- Data freshness, cleansing, accuracy, and completeness.
- Scalability in terms of concurrent users by delivery mechanism.
- Mixed workload management to ensure service level performance goals.
- Tactical query response time measures by type of user and analytic.
- High availability metrics by user community and delivery mechanism.

Failure to negotiate and meet these SLAs puts company revenues, costs, and reputations at serious risk. The light-hearted early days of putting ETL scripts, schema changes, and new reports into production using haphazard tools and processes must be replaced with rigorous quality testing, strong operational procedures, and failover systems that ensure end-to-end information availability. The pervasive BI infrastructure must be integrated into the mainstream of existing IT operations. Other critical success factors are architectural. Flexibility and versatility are needed to future-proof the IT infrastructure from ever increasing communities of users and devices. Many organizations have turned to portals and web services for flexibility and versatility. The same is true with data integration services where real-time data collection must accommodate new sources and types of data on a regular basis. For many organizations, pervasive BI is the next step. Existing ETL tools evolve into data integration servers. Existing data warehouses are

activated. And existing BI platforms renew themselves as decision services. What this requires is a new set of service levels recognizing the performance demands and end-to-end mission critical availability requirements of an Active Data Warehouse. Well defined SLAs clarify design goals and enable thoughtful business executives to connect the dots between fresh data and competitive advantage.

Conclusions

Unlike the traditional ERP, the business intelligence applications offer a new environment in which users receive easier desired, correct and reliable information. The need to understand further than figures from reports and to explain different situations bad or good is covered by business intelligence, applications which proved to be not very expensive, nor difficult to implement becoming a need for decision making processes.
The economic target is not limited to corporations and includes also small and medium companies: everyone of these needs reliable information at the right time.
Business intelligence capitalize the advantage of enterprise applications such as ERP, CRM, SCM already installed, which maximizes the benefits of IT. Business intelligence extracts valuable information from OLTP data bases of the corporations therefore this large companies which invested in building data warehouses can do the next step in implementation of a business intelligence system which concludes all investment efforts.

Reference:

- Reducing the total cost of ownership of business intelligence – MicroStrategy white papers
- Critical success factors to deploying pervasive business intelligence – MicroStrategy white papers
- Critical capabilities for business intelligence reporting – Gartner